Tjakura Antunymanutjaku: Looking after Tjaku<u>r</u>a in the A<u>n</u>angu Pitjantjatjara Yankunytjatjara Lands, a Recovery Plan



Photo by M. Daniel and A. Hudd

Throughout this plan the great desert skink, Egernia kintorei, will be referred to as 'Tjakura' which is the Pitjantjatjara name used by A<u>n</u>angu of the A<u>n</u>angu Pitjantjatjara Yankunytjatjara Lands, South Australia.

Thalie Partridge, 2008



A<u>n</u>angu Pitjantjatjara Yankunytjatjara Land Management

Tjaku<u>r</u>a Antunymanutjaku ~ A<u>n</u>angu Pitjantjatjara Yankunytjatjara Land Management

Prepared by Thalie Partridge (Anangu Pitjantjatjara Yankunytjatjara Land Management)

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This is a Recovery Plan prepared by A<u>n</u>angu Pitjantjatjara Yankunytjatjara Land Management, with assistance of funding provided by the Indigenous Land Corporation.

This Recovery Plan has been developed with the involvement and cooperation of a range of stakeholders, but individual stakeholders have not necessarily committed to undertaking specific actions. The attainment of objectives and the provision of funds may be subject to budgetary and other constraints affecting the parties involved. Proposed actions may be subject to modification over the life of the plan due to changes in knowledge.

An electronic version of this document is available on the Anangu Pitjantjatjara Yankunytjatjara website <u>www.waru.org</u>

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This plan was prepared by Anangu Pitjantjatjara Yankunytjatjara (APY) Land Management in consultation with Anangu stakeholders primarily from the Watarru Community. Anangu, including Mary Pan, Illawanti Ken, Tinpulya Mervin and Frank Young, have been fundamental to the success of Tjakura management in South Australia, including rediscovering the species in 1997 and the identification of all known colonies. A number of APY Land Management employees (Matt Daniel, Anita Hudd, Jackie Bice, Gary McWilliams and Belinda Cooke) have assisted in Tjakura management activities and much of the information in this plan is taken from data collected, their trip reports and reports to funding agencies. Funding agencies/programs that have assisted Tjakura management include; Indigenous Land Corporation, Indigenous Protected Areas program, Threatened Species Network, Wildlife Conservation Fund, South Australian Museum, Alinytjara Wilurara Natural Resource Management Board and the Department of Environment and Heritage, SA (Kuka Kanyini Program). The Department of Environment and Heritage has provided significant support and information to Tjakura management in the APY lands from initial surveys as part of the 'Biological Survey of the AP Lands', to the Watarru Kuka Kanyini project and the assistance of the AW Regional Ecologists. Wati Tjakura (aka Steve McAlpin) has assisted with monitoring and provided advice on management. A number of people have also provided important comments in the development of this recovery plan.

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Executive Summary

Tjaku<u>r</u>a were rediscovered in 1997 by two A<u>n</u>angu women, Mary Pan and Illawanti Ken, while out hunting for Tingka (Sand goanna, *Varanus gouldii*). Three Tjaku<u>r</u>a were captured in November 1998, brought into the Watarru community and shown around. There was considerable excitement, as most people had never seen Tjaku<u>r</u>a before. 'The older people accompanied us around the town and spoke about this animal and the stories associated with it' (Hudd 1998).

Since the species rediscovery significant survey and monitoring work has been undertaken by Anangu with the assistance of Anangu Pitjantjatjara Yankunytjatjara (APY) Land Management and other visiting ecologists. The intention of this document is to bring together information collected from different sources on Tjakura distribution throughout the APY lands and examine monitoring that has been undertaken. Information presented here includes:

- Status, distribution and habitat
- Cultural importance
- Known and potential threats

The Plan then aims to assess management actions to produce a recovery strategy for future successful management of this species on the APY lands. The recovery strategy has been developed in consultation with Anangu from Watarru and with advice from Tjakura ecologist, Steve McAlpin, and ecologists from the South Australian Department of Environment and Heritage. Priorities include:

- Assessment and management of predators
- Systematic monitoring of known colonies
- Protection of known colonies
- Surveys for additional colonies, including learning about alternative habitat types used by Tjaku<u>r</u>a in Western Australia and the Northern Territory.
- Building involvement of traditional owners and increasing employment opportunities for Anangu from the Watarru community.

The plan has been written in consultation with A<u>n</u>angu who have cultural responsibilities for Tjaku<u>r</u>a and who have significant knowledge of its biology, habitat requirements and potential threats to its survival. The plan has also been written to aid APY's Land Management Unit to direct Tjaku<u>r</u>a management activities and provide some guidance for visiting land managers and scientists interested in assisting A<u>n</u>angu to look after Tjakura. The strategy is intended to be implemented by the APY Land Management Unit, in a process staged over 5yrs. Successful implementation will be dependent on the provision of adequate resources and on the success of APY Land Management in engaging A<u>n</u>angu, young and old alike, in the strategy.

Additional technical information and rationale

Reasons of space and accessibility have meant that some of the technical information underpinning this strategy has been restricted to a companion document, copies of which may be obtained from APY Land Management.

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Introduction

APY Lands

The Anangu Pitjantjatjara Yankunytjatjara (APY) Lands are located in north-western South Australia (figure 1), covering an area of approximately 103 000 km² (approximately 10% of South Australia). There are seven major communities and over seventeen homeland centres. The northern region is dominated by prominent ranges, the Musgrave, Mann and Tomkinson (east-west). In the east the Everard and Indulkana ranges are also dominant features of the landscape. Moving south and west from the ranges the country changes into alluvial plains, mulga woodland and sand dunes that form part of the Great Victoria Desert. Average rainfall is around 275mm at Ernabella community which is located near the Musgrave Ranges. Rainfall is likely to be significantly lower in other parts of the APY lands, particularly to the south-west.

The majority of the APY Lands are not developed for any industry or enterprise but are protected in order to look after native animals which are threatened in the State or to allow hunting of game animals such as kangaroos. Areas on the APY Lands continue to be burnt by Traditional Owners according to Law or to aid hunting. The area is also susceptible to wildfires. Cattle are run predominantly in the north-east of the APY Lands. Other feral herbivores, which impact across the APY lands, are rabbits, horses, donkeys and camels. Foxes and feral cats are present across the APY Lands and buffel grass continues to increase in distribution. While much of the APY Lands are covered by mining exploration leases there has been very little mining activity as yet. Two areas, Watarru and Walalkara are designated as Indigenous Protected Area's (IPA) and another three are planned. Tjaku<u>r</u>a are currently known from the Watarru IPA in the west of the APY lands.

Governance

Anangu Pitjantjatjara Yankunytjatjara is the landholding body for the traditional lands of Anangu in northwest South Australia. The Lands are held as freehold under the Anangu Pitjantjatjara Land Rights Act (1981). This act established Anangu Pitjantjatjara (now Anangu Pitjantjatjara) as 'the governing Body Corporate', the functions and responsibilities of which are (a) "to ascertain the wishes and opinions of traditional owners in relation to the management, use and control of the lands" and (b) "to protect the interests of traditional owners in relation to the management, use and control of the lands".

Anangu have maintained continuous occupation of these Lands and practice much of their cultural traditions. Significantly they have established two Indigenous Protected Areas on the Lands specifically to manage for conservation purposes and to support the continued practice of traditional land management and associated skills and knowledge. The APY Land Management Unit was established in 1990 to assist Anangu to realise their land management aspirations for their own land. The Unit employs 6 full time staff and up to 100 individuals on part time and casual work. The Unit manages a wide range of projects covering threatened species management, maintenance of traditional ecological knowledge, water security, pastoral development, feral animal control, protected area management and landscaping and dust suppression.

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Figure 1. Location of the Anangu Pitjantjatjara Yankunytjatjara Lands (see inset map) and major communities, roads and the Watarru and Walalkara Indigenous Protected Areas.

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Tjakura, great desert skink, Egernia kintorei

Species Description

The Tjakura is a large burrowing skink which grows up to 45 cm long and can weigh 350 g (see cover for photo of Tjakura). The tail is slightly longer than head and body and may be used to store fat reserves (McAlpin 2001). It is a very distinctive orange colour with a white or yellow belly. Males are larger than females and have a broader head. Tjakura are typically inactive during the cooler months of the year. The species is viviparous and one to seven live young (70-80 mm snout to vent (SVL), 9-13 g) may be born in early summer (McAlpin 2001). Males mature at around 175mm SVL, females at approximatel 166mm (Pearson et al 2001). Tjakura live in extensive, multi-entrance burrow systems which can measure up to 10m in diameter and over 1 m deep. Burrows may start with a single tunnel entrance or occasionally Tjakura will enlarge a burrow of another species, eg E. striata. Tjakura warrens are constructed around fallen branches and small shrubs which may provide both structural stability for warrens and protection for Tjakura (Figure 2). They are readily identifiable by their prominent 'latrine' or toilet areas (Figure 2). A burrow houses a family group consisting of a pair of adults, subadults from previous years and juveniles. Subadults may reach sexual maturity in their second year when they will disperse from their natal burrow. Males then attempt to establish a burrow system, but many new burrows fail, possibly due to predation pressure (McAlpin 2001). Occupancy of burrows appears to be dynamic with lizards moving between burrows, abandoning and re-establishing them, possibly due to mortality and the need to search for a mate (McAlpin 2001). Colonies may also shift to a new location. This movement is not well understood but may be in response to predation pressure and changes in food availability (McAlpin 2001). Movements from burrows were also noted by Anangu who suggested that Tjakura move from hole to hole, but sometimes come back to old holes (Bice 2001).



Figure 2. Marked Tjaku<u>r</u>a warren at Watarru. Note the latrine at the top centre of the image, burrow entrance is located under the dead mulga (Photo B. Cooke).

Trapping of Tjaku<u>r</u>a was undertaken in 1998 and 2001 (Daniel 1999, Bice 2001). Details of individual measurements are shown in Appendix 1. Toe clippings taken from trapped individuals are stored in the frozen tissue collection at the South Australian museum. There has been no assessment of the genetic diversity of Tjaku<u>r</u>a in South Australia.

Food/Mai

Tjaku<u>r</u>a are diurnal. They forage actively at night away from their burrow entrances but have also been observed catching prey as it passes their burrow entrances (Daniel 1998, McAlpin 2001). Tjaku<u>r</u>a are considered to be omnivorous, eating a variety of plants and invertebrates. McAlpin (personal communication) has suggested that a change in food availability may play a role in the decline and shift of colonies observed in the APY Lands and elsewhere.

A<u>n</u>angu have significant knowledge of Tjaku<u>r</u>a food: '*They eat skinks, grasshoppers, centipedes and beetles... They also eat Maku and Makura (Maku with wings). After rain, the Maku become Makura, they land on the ground in large numbers and the Alkarka (large meat eating ants) collect them in their nest. The wings are left outside. The Tjakura dig up the ants' nest and eat the Maku (this may be referring to termites and their larvae).' Information provided by A<u>n</u>angu to the Biological survey team (Robinson et al 2003). Anangu have also reported that Tjaku<u>r</u>a like to eat mutu mutu (generic name for beetles) that live inside logs (Bice 2001) and the Hawkmoth's caterpillar known as <i>Anumara* (this caterpillar was also referred to as maku for Tjaku<u>r</u>a or Tjaku<u>r</u>a's witchetty grub personal communication 2007). Tinpulya Mervin has also identified a chenopod (*Marinacae spp.*) as a food plant (Cooke 2003). Disagreement with some of these statements has been expressed by A<u>n</u>angu to the author; Tjaku<u>r</u>a diet will be investigated further with A<u>n</u>angu in the field.

Some assessment of Tjaku<u>r</u>a diet through scat analysis has also been conducted in the APY Lands. Daniel (1999) reported scats to contain ants and beetles (including shield beetles) and some vegetation (including *A. minura* leaves). Cooke (2004) also recorded a mixture of ants, termites, small and large beetles, fruits (*Solanum spp.*), dirt and Spinifex grass. Bice (2002) recorded insect parts in scats, however scats from a site burnt two years before sampling contained large amounts of *Maireana* sp (blue bush) and *Solanum centrale* seeds.



Figure 3. Adult, subadult and juvenile scats (Photo T. Partridge).

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Status

Tjaku<u>r</u>a are listed as Vulnerable under the *Environmental Protection and Biodiversity Conservation Act 1999* and the *IUCN Red list of Threatened Species*. In South Australian it is listed as Endangered under the *National Parks and Wildlife Act 1972*. In the Northern Territory and Western Australia it is listed as Vulnerable (*Northern Territory Territory Parks and Wildlife Conservation Act 2000* and *Western Australia Wildlife Conservation Act 1950* respectively).

'Sometimes they were harder to find as burrows were empty and sometimes you needed to walk a long way' Robin Kankanpakantja (Daniel 1999). Ginger Mick (Daniel 1999) stated that 'They are a good meat, tastes a bit like fish' and that he used to eat them a lot in the early 1960's. Daniel (1999) suggested that these comments and other anecdotal evidence may be representative of a widespread decline on the APY lands coinciding with an increase in cattle, and a decrease in traditional land management practices after the 1960's.

Further information on the status of Tjaku<u>r</u>a communities is not conclusive. Since the species' rediscovery seven colonies have been recorded and one more may occur just over the southern border of the APY Lands. The most recent population estimate from six of the surveyed colonies was 273 individuals and contained 80 adults (McAlpin 2007). It is unknown whether this is an increase in the Tjaku<u>r</u>a population size as it may be a function of either search effort or population health. One of the known colonies has declined to just one active warren since it was first recorded. This may be explained by the fact that colonies of the species have been known to 'shift' location (McAlpin 2001). Until a longer period of systematic monitoring has been conducted and threats to the species are better understood the population size recorded in the APY Lands suggests that its status should remain as 'Endangered' in South Australia.

Cultural importance

In 1998 following the rediscovery of Tjaku<u>r</u>a AP Land Management visited a Tjaku<u>r</u>a Tjukurpa site (place of cultural significance). The Tjukurpa 'story' is recorded below (still to be added) by senior elder, Ginger Mick (Figure 4). The site, however, was in poor condition when last visited by Piranpa staff in 2005, with few living mulgas (caused by a wildfire and cattle or camel damage). The site is also reported to have suitable habitat for Tjaku<u>r</u>a. This place is therefore considered to be a high priority for protection and management.

Pitjantjatjara Language Version



Figure 4. Senior elder, Ginger Mick, at the Tjaku<u>r</u>a Tjukurpa site, Aralya in 2005 (Photo G. McWilliams).

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Benefits to other species

A related species the night skink, *Egernia striata*, has been recorded living sympatrically with Tjaku<u>r</u>a and in habitat currently not occupied by Tjakura. The night skink is smaller than the Tjaku<u>r</u>a and is known as Tjaliri in Pitjantjatjara. The distribution and habits of this species is also poorly understood. Surveys for Tjaku<u>r</u>a will enable the identification of it and an assessment of its distribution in the APY Lands. In addition, other species, particularly goannas (*Varanus* spp.) but also small mammals such as the endangered mulgara (*Dasycercus blythi*, Körtner *et al* 2007), are known to use Tjaku<u>r</u>a burrows (Figure 5). Any management of Tjaku<u>r</u>a is likely to benefit these species as well.

Broader biodiversity benefits gained from the plan will be a better understanding of threats to reptile ecology in the APY Lands, in particular feral predators and fire. An assessment and development of the fire management needed for Tjakura populations is likely to benefit a range of other species, preferred habitat of Tjakura and surrounding ecological communities.



Figure 5. Sand goanna using a Tjakura burrow at Watarru (Photo T. Partridge)

Social and economic impacts

Management of this species will have positive social and economic impacts for A<u>n</u>angu. They will gain greater ownership of the project which will lead to empowerment of senior A<u>n</u>angu in the community who act as role models for their children. Management of Tjaku<u>r</u>a will produce significant employment of A<u>n</u>angu who are skilled in identifying warrens and carrying out management activities. A direct impact of increased money within the community will be the flow on to the stores and clinics enabling them to operate more successfully. There will also be significant training opportunities in new technologies and new management methods. Tjaku<u>r</u>a management will also assist A<u>n</u>angu in the maintenance of language, culture and indigenous ecological knowledge through the contextual use of language and transmission of bush skills such as plant and animal

identification and linking stories and knowledge of places with navigation through the landscape. In addition, communities will have longer term benefits through the involvement of local schools and children from communities on the APY lands in field work. Land management activities should be a focus for education as they assist with literacy, numeracy and mapping skills. Socially the work provides a level of cohesion and focus for the community who must work together to achieve results. There are also issues such as health and well being that may be enhanced by being on country and carrying out land management activities and these need to be investigated. There needs to be development of indicators to determine the social and economic benefits of these types of programs.

Distribution, Abundance and Habitat

Past and current distribution

The great desert skink is considered to have been distributed widely throughout the Great Sandy, Gibson, Great Victoria and Tanami Deserts in the eastern interior of WA and adjacent areas in south-western NT and north-western SA (figure 6). Known records while widespread are scattered and often based on the capture of only one individual (Pearson 2001). Much of this country is unsurveyed and the precise distribution of the species remains unknown (see McAlpin 2001 for more information).



Figure 6. Estimated distribution of Tjaku<u>r</u>a in Australia (Department of the Environment, Water, Heritage and the Arts (2008).

In the A<u>n</u>angu Pitjantjatjara Yankunytjatjara Lands Tjaku<u>r</u>a are found within the Watarru Indigenous Protected Area (Figure 7). Seven active colonies have been recorded. Inactive warrens and historic verbal records were reported from near Umutju (within the Petermann Aboriginal Lands Trust in the Northern Territory) in 2002 (Bice, 2002). There is also one record just over the APY border in the Mamungari Conservation Park. Not including this record the total extent of occurrence is approximately 1650km2 with 0.015% occupied. Much of the country within this area and surrounding it has not been surveyed. Historically the species was collected by Finlayson from Punti

Soak, approximately 80kms east-north-east of Watarru (Loveridge 1938). Anangu also provided information to the team involved in the biological survey of the APY lands (Robinson et al 2003);

'They used to be everywhere in the sand dune country in the 1940s, 1950s and perhaps as late as the 1960s... They used to be common around Iltur (Coffin Hill), and also seen at Yalukunyu, southwest of Fregon and Iliya, south of Fregon. Have been seen between New Well and the Mulga Park Road'

This information suggests that the distribution of Tjaku<u>r</u>a has declined throughout the APY Lands; however, *E. striata* (known as Tjaliri) can also be referred to as Tjaku<u>r</u>a by A<u>n</u>angu and there may have been some misidentification of species in the above statement. The distribution of Tjaliri is also poorly understood.



Figure 7. Location of each colony within the Watarru IPA.

Habitat critical to the survival of the species

Tjaku<u>r</u>a are found in open sandy habitat however that which is critical to the survival of the species remains poorly understood. The soils on which Tjaku<u>r</u>a occur are low nutrient sandy soils generally derived from sandstones and quartzite. In the Northern Territory and Western Australia their preferred habitat is typically dominated by *Triodia* spp. and a variety of scattered shrubs. In contrast, Tjaku<u>r</u>a in the APY lands occur in open mulga woodland with a very open grassy understory (predominantly *Eragrostis eriopoda*) and a sparse shrub layer of *Eremophila gilesii*. This habitat is notable because it does not contain any *Triodia* and elsewhere they have not been recorded in open mulga woodland. McAlpin (2007) described two variants on Tjakura habitat in the Watarru region that were related to the soil type of the lower areas of the sand plain:

Type 1 soils derived from Watarru Gneiss: open mulga woodland with a very open grassy understorey dominated by Woolybutt grass, *Eragrostis eriopoda*, with sparse *Eremophila gilesii*. (Figure 8a)

Type 2 soils derived from Permano adamellite: very open mulga woodland with a well developed shrub layer dominated by *E.gilesii* (Figure 8b).

The general habitat type was described in Robinson et al (2003). It was considered to be a large and complex group but primarily consisting of low open mulga woodland and perennial tussock grasses. It is found to occur on sandy soils with a high loam and clay component. Key species defining the group include the mulgas; *A. aneura* (including a number of varieties and intermediate forms), *Acacia minura*, *Acacia paraneura*, understorey species; *E. eriopoda/laniflora*, *Monochather paradoxa* (Bandicoot grass), *Thyridolepis mitchelliana* (window mulga grass), *Calandrinia reticulata* (parakeelya), and the shrubs; *Maireana villosa* (silky bluebush), *Eremophila latrobei*, *Eremophila clarkei* and *Eremophila gilesii* (this species was considered to be uncommon). Areas of similar habitat are shown in figure 9. These areas will be investigated for the presence of Tjakura colonies.



Figure 8a (Photo S. McAlpin) and 8b (Photo T. Partridge) showing the two variations on the habitat where Tjaku<u>r</u>a have been recorded in the Watarru IPA (note the Tjaku<u>r</u>a burrow at the bottom left corner of 8a)

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A number of Pitjantjatjara names have been provided for the plants in Tjaku<u>r</u>a habitat. These will be discussed in more detail during future field work. Plant names include:

wana<u>r</u>i, wintalyka, ka<u>l</u>pilya – *Acacia aneura* wangu<u>n</u>u – *E. eriopoda* nga<u>r</u>anku<u>r</u>a, mintjingka – *Eremophila latrobei*, mulili – *E. gilesii*,

In the *Triodia* dominated habitat used by Tjaku<u>r</u>a in the Northern Territory and Western Australia fire is a dominant process to which Tjaku<u>r</u>a were thought to be well adapted. At Uluru Tjaku<u>r</u>a were recorded using habitat that had been burnt within the previous 3-22 years, with greatest productivity of burrows in areas burnt within 10 yrs (McAlpin 2001, 2002). While in Western Australia colonies were recorded in small areas of hummock (*Triodia* sp., Spinifex) grassland that had escaped the most recent fire but were in proximity to regenerating areas (Pearson 2001). McAlpin (2001) suggests that extensive wildfires may remove cover and food resources and create inhabitable areas of a size larger than the movement capabilities of the species. 'Traditional' patch burning may have restricted the movement of wildfires and provided habitat at varying stages of regeneration, some of which would be suitable for Tjaku<u>r</u>a. At Watarru the habitat occupied by Tjaku<u>r</u>a has a significantly lower fire frequency due to the open nature of the vegetation and very low fuel loads compared to the hummock grasslands in Western Australia and the Northern Territory. Most of the Tjaku<u>r</u>a colonies have not been burnt for a long time (>20yrs) and may only develop sufficient fuel to carry a fire every 40-50 years.



Figure 9. Vegetation quadrats surveyed during the biological survey of the APY lands (Robinson et al 2003). Black circles show quadrats found to contain the Mulga woodland habitat complex in which Tjakura might be found. The map also shows major roads and shading represents the altitude of hills and plains.

Colony location and description

The size of a single colony in 2007 varied from an estimated 6 to 96 individuals with a total population size of at least 273 adults and juveniles (McAlpin 2007). The location of each colony is shown in Figure 7. Coordinates of warrens at each colony may be obtained from APY Land Management. Figure 9 shows the growth of each colony since discovery, however it should be noted

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that search effort varied significantly each year. Colonies A, B and C have declined during the recording period. Colonies B, F and H need significant assessment of their extent and population size. Habitat between colonies A and F and colonies C and G should be searched for Tjaku<u>r</u>a warrens or activity. Colony I, recorded officially in 2007, is the largest colony with 18 of 21 warrens currently active and an estimated 96 individuals, it may be larger as not all suitable habitat was surveyed. Descriptions of each colony are taken from McAlpin (2007) and on-ground work reports (see Appendix 3 for report summaries). Colony E is not included as it was later identified as a 'Tjaliri' burrow, not Tjaku<u>r</u>a.

A – Iyaru/Mt Poondi Rd

Soils/Geology: Sandy plain adjacent to a series of low outcropping metasediments to the south-west and north-west. There are also dunes nearby with a very low dune immediately to the west and larger ones to the east.

Vegetation: relatively dense mulga woodland with an understorey of principally woolybutt grass, *E. eriopoda* and a shrub layer made up of *E. gilesii*. Burrows constructed in open areas among grasses and shrubs or under dead wood.

Fire History: McAlpin (2007) suggested that the periphery of the site was burnt by a fire in the last two years and predicted that the main site, based on the size of mulgas (3-6m tall) had been unburnt for 40-50 yrs. Bice (2001) recorded a fire 2-3 years previously, with about 70% of trees in the entire site dead. recorded that a fire occurred in 1998/1999 in the vicinity of warren A1.

Colony activity: M. Pan, K. Mervin, and S. Young located this colony in 2001. Colony included six active warrens and one inactive warren. Trapping in 2001 unsuccessful due to cool weather conditions. Highest activity was in late 2003 (10 active burrows) and August 2004 (eleven active burrows). In 2007 at total of 23 burrows were monitored, however only 2 were active. Current population estimated at 3 adults, 3 subadults and five juveniles.

B – Mt Poondinna

Size/extent: located south of sites A and F and north of the Mt Poondinna road.

Soils/Geology: Soft soil with a crust caused by the fire (Bice 2001).

Vegetation: All mulga burnt and sparse ground cover remained in 2001. Large amount of kampurarpa (*Solanum centrale*). (Bice 2001).

Fire History: Burnt in late 2000

Colony Activity: Two active warrens located in 2001 by Kangitja Mervin whilst collecting bush tomatoes. Both warrens were active in August 2004 but inactive in November 2005.

C – Original colony

Soils/geology: Sandy plain in an area of widely scattered low dunes and occasional metasediment outcrops. Low gravelly, calcrete rises occur adjacent to this colony and the nearby colony G.

Vegetation: (McAlpin 2007) Similar to A. Well developed mulga woodland over *E. eriopoda and E. gilesii*. Burrows constructed in more open, sunny areas among grass and shrubs. (Daniel 1999) flat relatively wet area consisting of *A. aneura* and *A. minura* woodland. Ground cover includes *E. eriopoda*, parakeelya (*Caladrinia* sp.) some very old *Triodia* (described by A<u>n</u>angu as 'rubbish' spinifex) and bandicoot grass (*Monachather paradoxa*). Shrubs also included the occasional senna and witchity bush (*A. kempeanal*).

Fire history: Unburnt for 20-30 years (estimated by Spinifex condition, *A. aneura* and *A. minura* size class and fire scars on dead mulga, Daniel 1999). McAlpin (2007) estimated last fire was greater than 40 years ago.

Colony activity: M. Pan and I. Ken discovered colony in 1997. Discovery confirmed in 1998 by M. Hutchinson and M. Daniel. At this time 9 warrens were recorded but only one was active. Activity peaked in 2004/2005 with eight active warrens. In 2007 only one warren was active and it was estimated to contain two adults, one subadult and three juveniles.

D - Near Atuti

Size/extent: 30 - 40 ha

Soils/Geology: roughly circular valley of 2-3 km across with large rocky hills on all sides.

Vegetation: Tjaku<u>r</u>a restricted to lens of very open mulga woodland in the north of valley which is surrounded by open shrubland and Spinifex on a sandier soil. Tar vine, *Boerhavia* spp. Common in April 2007. Presence of large Hawkmoth caterpillars, Anumara, were common at this time.

Colony Activity: Two active warrens recorded in 2004, one additional warren in 2006. In 2007 10 person hours were spent searching the site and a total of six active warrens were recorded. Potential for undocumented burrows is high due to the amount of unsearched habitat. Population size was estimated at 13 adults, 18 subadults and 23 juveniles.

Site specific threats: some large and expanding rabbit warrens adjacent to Tjaku<u>r</u>a warrens. Rabbits may have taken over Tjaku<u>r</u>a burrows.

F - west of A

Soils/Geology: similar to A

Vegetation: similar to A – open mulga woodland with a well developed grass layer of *E. eriopoda* and *M. paradoxa*.

Fire History: At least 40-50yrs since last fire?

Colony Activity: One warren recorded in November 2005. It was still active in 2007 along with a second large family warren. Total population size at the colony is estimated as 4 adults, 6 subadults and 9 juveniles.

Site specific threats: dingoes seen in the vicinity of the colony, one at a large rabbit warren.

G – south of **C**

Soils/Geology: see colony C

Vegetation: thick mulga woodland with *E. eriopoda* and scattered *E. gilesii*.

Colony Activity: Four active warrens were located in 2005 (note that activity at colony C peaked in this year). An additional four active burrows were located in 2006. In 2007 a total of 15 burrows were documented and 12 of these were active. Population was estimated as containing 24 adults, 25 subadults and 38 juveniles. Many of the burrows located in 2007 were new suggesting a recent expansion at the colony, possibly related to the decline of colony C.

H - South of Watarru border in the Mamungari Conservation Park.

Recorded by Frank Young and Ginger Mick in June, 2005. One burrow and two Tjaku<u>r</u>a found. This colony has not yet been revisited and no further information is available.

I - 12km west of D

Size/extent: not quantified, however habitat may cover several hundred hectares. Other similar habitat patches in the nearby vicinity.

Soils/Geology: similar to D.

Vegetation: very open mulga woodland dominated by *E. gilesii*. Burrows in open areas with *E. gilesii*. Unusually some burrows beneath open mulga trees.

Colony Activity: Recorded by Frank Young 2006/2007. Monitoring in 2007 confirmed that this is the largest known population in South Australia. 18 of 21 burrows were active in 2007. Total population size estimated to be 34 adults, 28 subadults and 34 juveniles.



Figure 9. Minimum number of active Tjakura warrens at each colony since they were discovered. Search effort varied significantly each year so results can only be considered an estimate of change. Colony: $\longrightarrow A \longrightarrow B \implies C \implies D \implies F \implies G \implies H \implies I$

Known and potential threats

It is unknown whether Tjaku<u>r</u>a populations are declining in the APY Lands. A<u>n</u>angu from Watarru recognise a number of threatening processes, however the level of threat these present to Tjaku<u>r</u>a is poorly understood. Some of these threats (eg. abundance of foxes and cats) must be monitored extensively prior to any management actions taking place. Others will need detailed monitoring as management actions are carried out. Some populations (A, B and C) have declined since their discovery. It is unknown whether this decline is a natural process (McAlpin 2001) or due to one or more threatening processes. Threats to Tjaku<u>r</u>a are listed below in order of priority (as determined by A<u>n</u>angu stakeholders from Watarru). It is unknown whether each colony is affected by these threats to the same degree.

Feral predators

Foxes, cats and dingoes are known to predate on Tjakura. Since their rediscovery Anangu have noted numerous instances of burrows being dug up by predators and a fox scat containing Tjakura has been collected (Cooke 2004b). The impact of predation on Tjakura populations is poorly understood. Fox baiting, using 1080 poisoned meat baits, has been trialled a number of times around Tjakura colonies (A, B, C and D) at Watarru. Some monitoring was conducted however resources prevented it from being undertaken consistently and it is difficult to determine the success of the baiting activities in controlling predators and protecting Tjakura. For example: monitoring in 2001/2 recorded an increase in cat tracks following baiting in 1999, however predator numbers at Colony C may have been affected by new 4WD access tracks; at Colony B high number of predators were thought to be due to a recent fire; while predators were not recorded at all at colony A (Bice 2002). In 2001/2002 a shooting regime specifically targeting cats, but also foxes, was introduced with a bounty payable on receipt of the tails, or other evidence (photos, body, etc) (Bice 2002). Bounties were paid for three cats and one fox shot from around Tjakura sites. Funds were not provided to continue this in the following funding year and it is likely that the bounty of \$20 was not high enough to cover a hunter's costs or increase hunting effort. The last baiting was conducted in 2004 after which it was deemed inappropriate without more detailed monitoring.

The Department of Environment and Heritage, SA, recommends that predator baiting is not undertaken in the vicinity of Tjakura warrens unless a clear need is demonstrated (DEH 2007). They highlighted the need for caution due to the impact of 1080 baiting on dingoes, and the effect it may have on the dynamics between dingo/dog, fox and cat numbers. Through both predation and competition dingoes may alter the abundance of foxes and cats (Glen *et al* 2007) and their removal may lead to an increase in fox or cat activity. Around Tjakura colonies this relationship is poorly understood. Regular and ongoing monitoring activities (eg. predator track transects) are required to determine the level of predator activity around the colony and the impact on Tjakura populations.

Changed fire regimes

Fire management strategies within the Watarru IPA were proposed in the Fire Management Strategy for the APY Lands (APY LM 2004). The Watarru IPA was considered as a specific fire management region due to continued and intense level of fire management conducted by Anangu. Small patch burning activities continue today in a relatively 'traditional' manner and may be highly ecologically significant. Burrows and Christensen (1990) have shown from aerial photography that burning

conducted in a traditional manner in the 1950's by Pintubi people created significantly smaller fire scars than observed in more recent satellite imagery. Qualitative assessments of patch burns at Watarru are difficult as they are not usually detected in satellite images. Fire scar maps (Landsat), assessed from 1984 – 2004, showed that large wildfires do occur though some wildfires would have occurred historically as well (R. Kankanpakantja cited in APYLM 2004): large areas were burnt in 1991-92 and 1994-95 (burning different patches of the Watarru IPA), about half the area was burned in 2000-01 and small areas again were burnt in 2001-02 and 2002-03. These wildfires tend to occur in the year or two following heavy rains. Fire frequency also tends to be highest around settlements and roads indicating that people are the main source of ignition. Figure 10 shows the fire frequency for the APY lands between 1985 and 2002.



Figure 10. Fire frequency in the APY Lands region, 1985 - 2002.

Two Tjaku<u>r</u>a colonies (A and B) in the APY Lands have been affected by wildfires. However, as reported above, in the APY lands Tjaku<u>r</u>a habitat has a reduced fire risk due to low fuel loads. This is in contrast to the Spinifex habitat in WA and the NT (McAlpin 2001) where they have been recorded in habitat regenerating some years after burning. The fire management required for maintenance of Tjaku<u>r</u>a habitat therefore needs further assessment. Some A<u>n</u>angu ecological knowledge of Tjaku<u>r</u>a fire responses has been collected. Tjaku<u>r</u>a warrens are constructed around fallen branches and small shrubs which may provide both structural stability for warrens and protection for Tjaku<u>r</u>a (Cooke 2004a). A<u>n</u>angu also outlined that they do not burn at actual Tjaku<u>r</u>a colonies or too close to warrens but a kilometre or so away. They expressed concern that if a fire burned too close to warrens it would endanger Tjaku<u>r</u>a and remove all protective covering from the sites (Cooke 2004a). However they have also suggested that Tjaku<u>r</u>a can hide underground when fire comes through and some may survive and reinhabit old holes (Bice 2001).

In the south-west of the Watarru IPA there is an area of cultural significance which is not allowed to be burnt (see Figure 11). Any fire management within the Watarru IPA needs to take this into account and involve Anangu who can ensure that the correct areas are burnt. Fire management must also incorporate GIS mapping of fire scars including ground truthing particularly of patch burns.



Figure 11. Tjaku<u>r</u>a colonies within the Watarru IPA. The red hashed area (approximate area only) cannot be burnt for cultural reasons.

Large herbivores

Camels occur in high densities within the Watarru IPA. A recent camel survey (Lethbridge 2007) suggested that country to the south-west and east of Watarru supported the highest densities of camels in the APY lands. Densities may be up to 1.05 camels per square kilometre. In 2001 Bice recorded camel tracks at Tjakura colonies and evidence of burrows being crushed. Since then Anangu have built stick fences around at least two warrens to protect them from camels and this does not appear to have affected the viability of the warrens (see Figure 12). Anangu have recently expressed significant concern about the impact of camels and have suggested that these areas must be given high priority for any camel control activities in the APY Lands.

Rabbits

No assessment of rabbit numbers around colonies at Watarru has been made. At Uluru rabbit warrens in areas near Tjaku<u>r</u>a habitat were identified and eradicated (McAlpin 1999). During recent planning meetings A<u>n</u>angu from Watarru suggested that rabbits were not common around Tjaku<u>r</u>a colonies. However, some damage has been observed (see Figure 13) and this will be assessed further.

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Figure 12. Senior elder, Tinpulya Mervin at a Tjaku<u>r</u>a warren protected from camels by a stick fence (Photo T. Partridge).



Figure 13. Rabbit damage at a Tjaku<u>r</u>a warren in the Watarru IPA (Photo S. McAlpin). Arrow shows location of an active Tjaku<u>r</u>a burrow.

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Management Issues and Practices

Surveying Tjaku<u>r</u>a

Since their discovery Anangu have been using traditional tracking techniques to survey for Tjakura colonies and located eight potential areas. APY Land Management also receives regular reports on the presence of Tjaliri (*E. striata*) located by Anangu while searching for Tjakura. When surveying for Tjakura Anangu are also hunting for other species of lizard or small mammal. This activity is typically conducted in a group of up to 10 people walking in a line, each person within calling distance of the next. Anangu must be equipped with data loggers/Cybertrackers to enable the surveyed areas to be mapped accurately and to develop maps of areas surveyed where Tjakura were not recorded.

Future surveys will also target areas of suitable habitat and historical records. Surveys can be conducted throughout the year. In winter when Tjaku<u>r</u>a are inactive it is difficult to tell how long it has been since a warren has been occupied, however weathering of burrows leading to their disappearance may be quite rapid depending on conditions (McAlpin 2002). Therefore it is likely that burrows detected would have been active in at least the last 10 years and the area should be assessed further.



Figure 14. Surveying country for Tjakura warrens in the Watarru IPA (Photo T. Partridge).

Monitoring Tjaku<u>r</u>a

Monitoring of all known colonies will be conducted annually during the warmer months of the year. At this time Tjaku<u>r</u>a show greater activity and subadults and juveniles will still be present in their natal burrow. Previously the resources available for this activity have not allowed equal monitoring effort at each colony limiting the ability to assess changes in the status of each colony. A minimum of two weeks intensive work is required for this activity to be conducted and to include training of A<u>n</u>angu in monitoring and data recording techniques. Time must also be spent determining the total extent of each colony, particularly if colonies are nearby as in colonies C and G, and colonies A and F. These colonies may be one large colony or a shifting colony.

Monitoring must record as a minimum:

- Name and coordinates of warren (numbered tags must be attached)
- Number of active and inactive warrens
- Size of warren (number of burrows and pop holes and distance apart)
- Size of latrine and approximate number of adult, subadult and juvenile scats
- Estimation of the number of individuals in each warren
- Fire history
- Search effort for additional warrens and total extent of known colony
- Predator and feral herbivore activity



Figure 15. Monitoring Tjaku<u>r</u>a, left: Wati Tjaku<u>r</u>a and Mary Pan assessing a latrine, right: Illawanti Ken pointing to a Tjaku<u>r</u>a burrow. (Photos T. Partridge)

Predator control and monitoring

Fox and cat control will not be conducted without appropriate baseline data to enable assessment of change in predator and Tjaku<u>r</u>a populations. One hundred metre long transects should be established on roads near each colony and monitored regularly. This length will allow more senior A<u>n</u>angu trackers who do not have the fitness for extended tracking to participate. Predator tracks should be recorded and any scats found should be collected and examined for prey type. Monitoring of each transect must be regular; APY Land Management recommends fortnightly to obtain reasonable data on predator dynamics throughout the year, however current funding will probably limit this to every second month.

Following 1-2 years of predator monitoring and if there is evidence of Tjaku<u>r</u>a decline due to predators, control can be considered. Control should target foxes and cats and avoid impacts on dingo populations. A variety of methods must be utilised, eg 1080 baiting and trapping. The effectiveness of control activities in reducing the impact of predators on Tjaku<u>r</u>a must be assessed annually and altered if deemed necessary. Dingoes are presumed to predate on Tjaku<u>r</u>a however their impact is unknown and it is presumed that foxes and cats are a greater threat to Tjaku<u>r</u>a populations. The known colonies are relatively remote from communities and the level of predation from camp/feral dogs is likely to be limited.

Introduced herbivore control and monitoring

The degree of impact of feral herbivores, camels and rabbits, needs further assessment. Control of camels must be initiated. Control methods include fencing colonies to prevent camel intrusion and removal of camels. Any mustering of camels will consider the location of Tjaku<u>r</u>a colonies and the mustering route must avoid these areas. Local camel culls are not recommended unless carcasses are removed due to the potential for predator numbers to increase significantly.

Any significant control of rabbits should be conducted in conjunction with predator control to prevent predators switching prey type to native species (Robley *et al* 2004). If rabbit numbers prove to be low within the vicinity of Tjaku<u>r</u>a colonies then it is suggested that A<u>n</u>angu be given support to control rabbits through traditional techniques.

Fire Management

A procedure for the implementation of fire management in the APY Lands has been available since 2004 (APY LM 2004) and this is also discussed above (see page 22); however there has not been adequate funding for it to be carried out and aspects of the plan may need to be revisited. Without a significant increase in funds it will only be possible to carry out opportunistic patchburning. While this will be conducted by Anangu with significant experience in traditional burning techniques the extent of burning will be significantly smaller than required or carried out historically.

It is recommended that funds are sought for a fire management officer based with APY Land Management who can conduct fire management training activities to enable young Anangu to learn skills from their elders. The fire management officer would also assist in the production, analysis and ground truthing of fire scars and the coordination of burning activities, particularly for the protection of threatened species.

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Recovery Strategy

Objectives and Timelines

There are two main objectives for Tjakura management over the next five years.

The first objective is to develop the ability of A<u>n</u>angu to conduct survey, monitoring and management activities independently. When advice and support from non-A<u>n</u>angu experts is required all work must be conducted together, *tjungu*, so that A<u>n</u>angu can learn about new techniques and non-A<u>n</u>angu experts can gain from the diverse expertise of A<u>n</u>angu (*ngapartji ngapartji* – I give you something, you give me something). In addition, it is important that A<u>n</u>angu retain ownership of all Tjaku<u>r</u>a management activities and are aware of all the information available so that they can continue to make informed decisions and participate in planning Tjaku<u>r</u>a management activities.

The second main objective is to obtain accurate information on the status and distribution of Tjaku<u>r</u>a in the APY lands and the extent to which threatening processes limit their populations. To achieve this, three main activities need to be conducted.

- 1. Implement regular and systematic monitoring of all known Tjakura colonies
- 2. Assess threats (particularly impact of predators) to Tjaku<u>r</u>a survival and implement management actions if deemed appropriate.
- 3. Conduct informed surveys for more Tjaku<u>r</u>a colonies.

The first of these activities is achievable but effort needs to be put into developing the involvement of Anangu through training in new technology such as hand held computers that will enable data recording to be conducted. The other activities will only be achieved with additional support through wages, vehicles and APY Lands based project managers. Fundamental to this recovery strategy is for the results to support ongoing adaptive management by Anangu. If this five year objective is achieved it will assist APY Land Management's long term objective of threat abatement, population increase and increase in the known distribution of Tjakura in the APY Lands leading to improved conservation status.



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Timeline of Tjakura Management Activities on the APY Lands

Each project administered by APY (previously AP) Land Management is available in Appendix 3. Activities listed are not complete as some external agencies and projects are not cooperating with APY in provision of detailed project data.

Early	Anangu managing numbers and harvesting at a sustainable rate.
1934	Species collected by Finlayson from Pundi Soak, approximately 80kms east north-east of Watarru (Loveridge 1938).
1997- 2001	Biological survey (Department of Environment and Heritage, South Australia). No Tjakura were caught during broad scale survey work (Robinson et al 2003).
1997	Mary Pan and Iluwanti Ken discovered a Tjakura while hunting for Tingka (sand goanna, Varanus gouldii).
1998	May: Colony C visited by AP Land Management but no Tjakura were found, fresh scats present. October: Colony C visited by AP Land Management, M. Hutchinson (SA Museum) and Mary Pan, Illawanti Ken (and others), one Tjakura recorded (measured, scale-clipped and released). November: Colony C visited by AP Land Management and three animals trapped from the only occupied burrow. Eight more unoccupied burrows recorded.
1999	Baiting trial conducted at colony C. Cat tracks increased following baiting.
2000	Watarru Indigenous Protected Area declared. Trapping conducted at Site C and Site A. Three colonies recorded.
2001- 2002	Baiting conducted (Nov?) at sites A, B and C?, no predators recorded at Site A. Bounties paid on fox and cat tails.
2003	Baiting conducted May at sites A, B and C
2003- 2004	Baiting was conducted at site A and C. Fox scat collected and found to contain Tjakura. New Site D recorded. Baiting was initiated after a warren was dug up by either a fox or dog.
2004	Watarru Kuka Kanyini project commenced. August 2004 baiting was conducted at site A and C, taken baits were replaced at bait stations and baits placed around the perimeter of sites.
2005	2005 – Four existing colonies monitored, three new colonies with active warrens recorded.
2006	One colony, I, recorded approximately 12km west of colony D.
2007	Steve McAlpin, assisted by SA DEH and APY Land Management conducts monitoring and survey of Tjaku <u>r</u> a sites in the Watarru IPA. Six of eight known colonies monitored.

Managemen	tt Actions Required					
Priority	Objective	Action required	Timeline	Performance Criteria	Resources, roles	Approximat
(as determined by A <u>n</u> angu stakeholders in Feb 2008)					and responsibilities	e cost
To be included as a part of all other objectives.	Transmission of Indigenous Ecological and Scientific Knowledge about Tjakura	 Involve schools, particularly the Watarru School, in above activities Produce education resources and extension material Assist Watarru School to produce a Tjakura story book Assist Anangu to learn about new technologies useful for Tjakura Present results at management Present results at national and international conferences and regional forums and publications 	Ongoing 1-2 years	 Increased awareness of Tjakura by Anangu, particularly local school students. Increased awareness of Anangu involvement in Tjakura management Increased understanding of scientific methodologies used to examine threatened species. 	APY LM Consumables Consultant/Educa tion Officer Funds for development and publication of Tjaku <u>r</u> a story book Funds for travel Support from Consultant/PY Media Schools Other Orgs	
Ч	To determine threat from feral predators and implement control if	 Establish permanent predator track transects in the vicinity of colonies. 	At least two years of	 Baseline data available on predator activity around Tjakura 	APY LM Hand held PC's A <u>n</u> angu Wages	
	requirea.	 Undertake regular 	monitorin	colonies.	4WU Troop	

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		monitoring (using	a nrinr to	Assessment level of	carriar	
		cybertrackers) of	any	predation through scat	Consultant/scat	
		predator activity at	control	analysis	analysis/transect	
		Tjaku <u>r</u> a colonies through	work.	Predators maintained	establishment	
		track and scat transects.		at levels where impact	Project support	
		 Predator control 		on Tjakura populations	officer	
		conducted if required.		is minimal (as	SA DEH	
				determined by survival	AW NRM	
				and recruitment of		
				Tjaku <u>r</u> a).	Other Orgs	
ſ	Population status quantified	 Cybertracker data 	Annual –	Changes in status of	APY LM	
۷	 Systematic monitoring of 	collection form	(Mamung	Tjaku <u>r</u> a populations	Hand held PC's	
	known colonies to	developed and linked	ari	able to be assessed.	A <u>n</u> angu Wages	
	determine growth or	with APY Land	Conservat		4WD troop	
	decline	Management database	ion Park,		carrier	
	 Complete descriptions of 	 Anangu trained in the 	every 2 nd		Consultant/herpe	
	each colony including	use of Cybertracker	year)		tologist	
	total size.	 With the assistance of 			Project support	
		Tjaku <u>r</u> a expert, Steve	2009-		officer	
		McAlpin, collect data on	2013			
		colony size and activity.			SA DEH	
		 Remote monitoring trip 			AW NRM	
		to Tjakura site in				
		Mamungari Conservation			Other Orgs	
		Park (conducted with				
		Maralinga Tjarutja				
		community) and Umutju				
	<i>P</i>	(conducted with Uluru				
		National Park Rangers.				
		 Use monitoring data to 				
		assess changes in				
		population size over				
				cc		

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		monitoring period.				
C	Cultural Importance and	 Recording of stories, 	Ongoing	 Special Tjakura sites 	APYLM	
C	protection of Tjukurpa sites	assessment of sites.		protected.	Hand held PC's	
		 A<u>n</u>angu trained in 	1-2 years	 Cultural information 	A <u>n</u> angu Wages	
		recording and storage of		archived	4WD troop	
		cultural information			carrier	
		 Protection of sites from 			Consultant/anthr	
		threats if required			opologist	
					Project support	
					officer	
					SA DEH	
					AW NRM	
					Other Orgs	
	Distribution of Tjakura across	 Survey sites where 	Ongoing/	 All suitable habitat and 	APY LM	
+	the lands determined	Tjaku <u>r</u> a have been	2009-	historical records	Hand held PC's	
		recorded previously but	2013	assessed for presence	A <u>n</u> angu Wages	
	Determine critical habitat	information on		of Tjaku <u>r</u> a, records of	4WD troop	
	requirements	identification is not		Tjaku <u>r</u> a absence kept.	carrier	
		available (record using		 Known distribution of 	Project support	
		Cybertrackers)	Ongoing/	Tjaku <u>r</u> a across the APY	officer	
		 Survey habitat across APY 	2009-	Lands increased	Travel costs	
		lands that is similar to	2013	 Improved 		
		Tjaku <u>r</u> a habitat (record		understanding of	SA DEH	
		using Cybertrackers)		Tjaku <u>r</u> a habitat	AW NRM	
		 Anangu Rangers to visit 	Once/	requirements		
		Tjaku <u>r</u> a sites in WA or NT	2009-		Other Orgs	
		to learn about Tjaku <u>r</u> a	2010			
		habitat and then assess				
		similar areas in the APY				
		Lands (record using				
Tr - 1				ç		

Tjaku<u>r</u>a Antunymanutjaku $\sim A\underline{n}$ angu Pitjantjatjara Yankunytjatjara Land Management

		Cybertrackers)				
Ъ	To determine and implement the best fire regime that leads to the protection of Tjaku <u>r</u> a colonies and increases available habitat.	 Develop fire section of APY LM database and GIS. Conduct and map patch burning activities (record using Cybertrackers) Implement relevant actions from the APY Lands fire management strategy. 	S+ years	 Improved understanding of scale, frequency, timing and patterning of fires around Tjakura colonies. Mitigation of the impacts of wildfires on Tjakura colonies. 	APY LM Hand held PC's A <u>n</u> angu Wages 4WD troop carrier Project support officer Fire management officer as per fire management strategy APY LM (2004) (2004) (2004) Consultant/fire ecologist SA DEH AW NRM	
9	Determine level of camel threat in each colony and prioritise their control in these areas.	 Assess colonies for camel degradation (record using Cybertrackers) Determine reason for camels using Tjakura habitat and develop management strategies Provide location information to APY LM staff involved in camel management activities 	2009 2009- 2013 Ongoing	 Level of impact determined and management strategies developed and implemented. 	APY LM Hand held PC's A <u>n</u> angu Wages for monitoring and camel control 4WD troop carrier Project officer Consultant/livest ock officer. SA DEH	2500/km 30000+
	_)	-	-	-	

Tjaku<u>r</u>a Antunymanutjaku $\sim A\underline{n}$ angu Pitjantjatjara Yankunytjatjara Land Management

AW NRM Other Orgs	APY LM Student/research er and running costs A <u>n</u> angu field assistant Project officer Casual anangu wages Travel costs SA DEH Universities Other Orgs	APY LM Hand held PC's A <u>n</u> angu Wages 4WD troop carrier carrier Consultant Project support officer SA DEH
	 Identification of unique aspects of Tjakura ecology and biology that may assist and improve management. Incorporating traditional knowledge and scientific knowledge in management 	 Level of impact determined and management strategies developed and implemented.
	Ongoing	5 years
	 Establish links with research institutions, research institutions, Useful projects would include Genetic analysis to assess inbreeding of isolated colonies, Tjakura diet and relationship with available food types in habitat (used and previously used by Tjakura) Participate in Tjakura Recovery Team activities Establish links with other Tjakura projects and invite members of the Tjakura Recovery Team activities 	 Assessment of threat conducted (record using Cybertrackers) Control through traditional methods or new technologies conducted if required.
	Conduct <u>joint</u> research to improve understanding of Tjaku <u>r</u> a ecology and status	Determine colonies under threat from rabbit competition
		∞

Tjaku<u>r</u>a Antunymanutjaku \sim A<u>n</u>angu Pitjantjatjara Yankunytjatjara Land Management

AW NRM	Other Orgs	APY LM	Project support	officer	A <u>n</u> angu Wages	GIS training	Consultant/livest	ock officer	Consultant/minig	liaison officer	Independent	consultant		Mining and	Industry
		 Industries and 	communities aware of	Tjaku <u>r</u> a colonies,	involved in surveys for	additional colonies and	in their protection	 no colonies damaged 	by industry activity	 APY LM supplied with 	data from external	projects and industry	activity		
		Ongoing											Í		
		 Provide conditions for 	industry to provide APY	LM with all data collected	on Tjakura	 Work with industry and 	communities to prevent	disturbance of Tjaku <u>r</u> a	colonies.	 Develop awareness 	package delivered by	A <u>n</u> angu			
		Observance by Industry and	Research												
		Emerging	issue												

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Evaluation of success or failure

Progress of recovery actions listed in this plan will be monitored and evaluated on an ongoing basis by APY Land Management and relevant Anangu stakeholders. A brief annual review will be sent to the Tjakura Recovery Team and to relevant funding agencies, project sponsors and wildlife management agencies. This review will examine the success of particular actions against the performance criteria listed in the plan. Particular actions were given priority by Anangu stakeholders at a Watarru community meeting in February 2008. These priorities will be reassessed with regard to the achievement of actions and the outcomes of monitoring and survey results. An annual planning and review meeting will be held with all Anangu stakeholders. It is imperative that this plan incorporate the ability for changes in management actions if information suggests that threats are greater than predicted. If additional funding is required, APY Land Management, with the assistance of the Tjakura Recovery Team, will look for funds from sponsors, philanthropic groups and Commonwealth and State agencies.

Monitoring and survey data, including burrow occupancy, predator activity and fire regimes will be compiled and summarised by APY Land Management and included in the annual progress reports. Outside agencies involved in Tjaku<u>r</u>a management in the APY Lands must provide APY Land Management with any data, project reports and management recommendations to enable their inclusion in the annual progress report.

Successful implementation of this recovery plan will be dependent on the provision of adequate resources and acknowledgement of the need for flexibility in actions and resources required to achieve management actions.

A<u>n</u>angu regularly highlight the need to work together, "tjungu". This has been part of the success of Tjaku<u>r</u>a management in the APY Lands to date and is fundamental to the success of Tjaku<u>r</u>a management in the future. Involvement of A<u>n</u>angu in all aspects of Tjaku<u>r</u>a management, from planning to implementation, is imperative. Their continued and increased involvement and approval of management activities will highlight the success of this recovery strategy.

Progress reports will be provided to the Tjaku<u>r</u>a Recovery Team to enable review of the National Recovery Plan for the Great Desert Skink in 2011. APY LM will provide comments to the Tjaku<u>r</u>a Recovery Team for its Recovery Plan review. APY Land Management will seek a qualified and relevant consultant to assist the review this regional Recovery Plan in 2013 and assess how it can work better with the National Recovery Plan at that time.

Implementation Costs

The estimated cost of implementing, reviewing and rewriting the Recovery Plan is \$? over five years. If monitoring results suggest greater impacts than predicted, or if additional colonies are detected in during the life of this recovery plan, costs of monitoring and management will increase proportionally. Funding agencies should be aware of this issue.

Other Management Requirements

Intellectual property, data storage and access

Waiting for comments from APY Lawyer.

Engagement with National Recovery Effort

Actions undertaken in the APY Lands to protect Tjaku<u>r</u>a will form part of the National Recovery Project. Actions conducted elsewhere will inform activities in the APY Lands and vice versa. A<u>n</u>angu from Watarru community have expressed the desire to invite other Indigenous people involved in Tjaku<u>r</u>a management to Watarru to learn about the different habitat utilised by the species here. They would also like to visit Tjaku<u>r</u>a populations in Western Australia and the Northern Territory to learn about Tjaku<u>r</u>a habitat in these areas. This will greatly expand indigenous knowledge of Tjaku<u>r</u>a in Australia and may lead to new colonies being discovered. The information and actions detailed in this Recovery Strategy can be used by the National Recovery Team to assess the progress of the National Recovery Effort. We also make the following recommendations;

- All results are shared with the Great Desert Skink Recovery Team through the annual reports. Location data from the APY Lands must not be published without APY approval.
- There is at least two representatives from the APY Lands at any future Great Desert Skink Recovery Team meetings and an appropriately qualified translator should be made available.
- Information from these meetings will then be communicated back to APY.

Research

Research which will contribute to our knowledge regarding Tjaku<u>r</u>a and its ecology and biology, and thus increase our ability to effectively manage the species, will be supported. The exact nature of the support will vary between research projects and researchers. A<u>n</u>angu will direct researchers and assist in the development of Tjaku<u>r</u>a research. A<u>n</u>angu must receive appropriate recognition and recompense for their contribution. New technologies and results from research must be demonstrated to up-skill A<u>n</u>angu to enable ongoing participation in all activities and at all levels of Tjaku<u>r</u>a management. Opportunities for employment will be encouraged. APY is developing research protocols and all potential research projects will be required to follow these guidelines (these will be available at <u>www.waru.org</u> in late 2008)

Mining and Infrastructure

Mining companies and other organisations involved in infrastructure development must ensure that no colonies are damaged by mining activities. Activities such as construction of roads, tracks or built infrastructure and mining activities may negatively impact on Tjaku<u>r</u>a populations. For example, at Uluru a road to the 'borefield' needed to be repaired to prevent water running off the track and into adjacent Tjaku<u>r</u>a colonies (McAlpin 1999). McAlpin (2001) recommends that infrastructure be sited approximately 5 km from active burrows.

Maps will be available for mining exploration companies (or other industry) so that they can plan to avoid Tjaku<u>r</u>a colonies. The APY deed of agreement (to be completed end 2008) with industry will require funding for A<u>n</u>angu to provide environmental and cultural clearance of any country to be developed. This will identify the presence of Tjaku<u>r</u>a in these areas.

Industry will be approached by APY Land Management for support in Tjakura Recovery work.

Communication

Stakeholders

A<u>n</u>angu Pitjantjatjara Yankunytjatjara has legal responsibilities for the management of the APY Lands and promotes and supports the aspirations of Anangu. All Tjaku<u>r</u>a management activities will be presented to the landholder for approval.

The APY Land Management Unit has significant expertise in the management of Tjaku<u>r</u>a and stores Tjaku<u>r</u>a data for the APY Lands. As a stakeholder, APY Land Management's responsibility is to coordinate all Tjaku<u>r</u>a management and research activities and provide advice to prospective researchers/ecologists and agencies applying for a research permit (this is currently being developed and will be available by the end 2008, a normal access permit will apply until this time).

Traditional owners have been nominated as key stakeholders during a community meeting held at Watarru in February 2008. They must be consulted in regards to all Tjaku<u>r</u>a management activities. This list reflects those that are currently active in this work but it is not exhaustive and further stakeholders should be considered during consultation. The Watarru Community must be advised of all proposed works and can provide advice on current conditions and resources within the community. They can also assist with contact for A<u>n</u>angu stakeholders.

Watarru:

Frank Young Charlie Antjipala Tinpulya Mervin Bernard Tjalkuri Wipana Jimmy Imitjala Pollard Yaritji Young Valerie Young Bronwyn Jimmy Illawanti Ken (Amata) Naomi Ken (Amata) Naomi Ken (Amata) Mary Pan (Amata) Malpiya Davies (Pukatja) Kuntjanu (Pipalyatjara/Watarru): Josephine Mick Ginger Mick

Walalkara:

Robin Kankanpakantja Antjala Robin Jeannie Robin Munti Robin

Sandy's Bore: Margaret Dodd Sammy Dodd

In addition they identified a number of women involved in threatened species management that can provide useful advice to APY Land Management and visiting ecologists as well as help explain and teach management activities to other Anangu. These rangers are mostly based in Pukatja community but have connections across the lands and in other states as well: Dora Haggie, Tjaria Stanley, Inpiti Winton and Ninguta Edwards.

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A number of other stakeholders exist. Staff from SA DEH have been involved in Tjaku<u>r</u>a management since their rediscovery and can provide significant advice to Tjaku<u>r</u>a managers. Advice should also be sought from Tjaku<u>r</u>a ecologist, Steve McAlpin, and the Great Desert Skink Recovery Team. A number of funding agencies have also had regular involvement in Tjaku<u>r</u>a management including; the Indigenous Land Corporation, SA DEH, Threatened Species Network (WWF) and the Alinytjara Wilurara Natural Resource Management Board.

Extension and Education Resources and Activities

A high priority for APY Land Management is the inclusion of school students in land management activities. Links will be made to the APY Land Management education and training strategy (under development 2008/09). Opportunities to link with the Anangu Tertiary Education Programme (AnTEP) to produce resources in language will be investigated by APY Land Management. Schools are involved haphazardly in Land Management work but on weekend field trips young Anangu are keen observers. In the past, photo stories have been developed to use when discussing management activities with school students and Anangu for who English is not a first language. A Tjakura fact sheet is available for download from the APY Land Management website. This document is particularly useful for teachers discussing threatened species with their students. Further opportunities for education activities may be developed with research activities. For example, one stakeholder from Watarru is developing a Tjakura story book.

Any research or management activities must provide opportunities for Anangu to be trained and employed in these activities. Education is recognised by Anangu as critically important to the maintenance of indigenous ecological knowledge and inclusion in the wider community. Anangu want to learn about new technologies and understand the benefits and new ideas that these technologies can bring.

Media

There are a number of media opportunities targeting A<u>n</u>angu audiences that will be taken up. Sections of this document should be translated for airing and A<u>n</u>angu stakeholders will be interviewed on the NPY Radio network. Opportunities for filming (both through PY Media and NITV and other networks) will be possible and funding should be sought to assist with this. Promoting national awareness of Tjaku<u>r</u>a management through outside media will be considered; however it should be recognised that PY Media typically compensates A<u>n</u>angu for their time (up to \$300/day).

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Appendix 2. On-ground works.

Since their re-discovery APY Land Management has been surveying country within the Watarru IPA for Tjakura warrens and has been able to record new warrens and colonies each year. This work has primarily been conducted by Anangu staff. Reports relating to on-ground work are summarised below.

Watarru 1st trip report (Anita, June 1998). Indigenous Protected Area Programme Anita Hudd visited the Tjaku<u>r</u>a site discovered by two women in 1997. The burrow was empty with no fresh scats or tracks in the vicinity. Two more burrows found and were dug up in search of Tjaku<u>r</u>a. No Tjaku<u>r</u>a were caught. Fresh scats were recorded near these burrows and were taken as specimens. Following this trip, scientific experts (eg. Peter Copley) were contacted regarding the confirmed discovery of the species.

Pilot study to confirm the alleged persistence of *Egernia kintorei* on the A<u>n</u>angu Pitjantjatjara Yankunytjatjara (Daniel 1999). Wildlife Conservation Fund. Elliot traps were set at the site where Tjakura were first recorded, now known as site C. Three animals were caught and marked by toe clipping. See Appendix 1 for description and measurements of individuals. Eight other burrows in the area were abandoned. In December 1999 Mary Pan and Illawanti Ken found another pair of burrows at quite a distance from the original burrow. The suggestion was made that animals abandoned the original area and moved. Several factors may have been responsible; however the possibility that a trial control of foxes and subsequent increase in the number of feral cat tracks recorded was linked to the colonies movement was considered to be sufficiently concerning to halt any predator control in the area.

Protecting Tjakura (*Egernia kintorei*) from feral predation on the *A<u>n</u>angu* Pitjantjatjara Lands, South Australia. (Bice 2001) TSN Community Grant.

Monitoring, trapping and searching conducted. Site C, Tjakura returned to original site after abandoning it and a further three warrens were active. 15 traps set and four individuals caught (see Appendix 1). This site may have been burnt 20-30 years ago. A further 10 areas were searched, 2 of which had active Tjakura warrens. Trapping was conducted at a second site (A) but due to sudden cool weather no Tjakura were caught. Seven warrens showed activity. This site was probably burnt in 1998 or 1999. The third site (B) was burn in 2000 and had two active warrens.

Management of Tjakura (*Egernia kintorei*) on the Anangu Pitjantjatjara Lands, South Australia (Bice 2002) TSN Community Grant SA02/101.

No new sites found, 3 know sites managed. Conducted burning around Tjakura sites. Foxes found to be digging up warrens during the hibernation period. Cats recorded and camel damage recorded. A number of actions were implemented to manage the impact of feral predators. They included the implementation of a closely monitored 3 monthly 1080 baiting program around the perimeters of the populations, an increased search effort to locate new populations and implement management, the introduction of a shooting regime specifically targeting cats, but also foxes, with the bounty (\$20 per tail) payable on receipt of the tails, or other evidence (photos, body, etc). The bounty system trialled encountered some initial difficulties due to the lack of usable, safe firearms in the

community. This has been recently remedied and shooting has been undertaken. To date a total of 3 cats and 1 fox have been shot around the Tjakura sites. The remainder of the bounty money will continue to be used for this purpose. Trapping conducted?

Management of Tjakura (*Egernia kintorei*) on the *A<u>n</u>angu* Pitjantjatjara Lands, SA. (Bice 2003). TSN Community Grant NT03102.

Special cultural sites to the south of known Tjakura colonies and patchburning conducted with direction from traditional owners. Burning conducted to the north and east of known populations, building on previous burns. Baiting conducted in late 2002 and warrens monitored for tracks in March 2003. No evidence of predation from tracking. Baiting conducted in May 2003. Numerous searches conducted but no new populations recorded.

Management of Tjakura (*Egernia kintorei*) on the A<u>n</u>angu Pitjantjatjara Lands. (Cooke 2004a) Wildlife Conservation Fund.

Improving habitat of Tjakura on the A<u>n</u>angu Pitjantjatjara Lands, South Australia (Cooke 2004b) TSN Community Grant NT01/103

Extensive surveys were conducted which revealed more warrens at known sites (A and C), site B only 2 warrens and discovered a new site, D. Patchburning was conducted around Tjakura habitat. Anangu outlined that they do not burn at actual Tjakura sites or too close to warrens but a kilometre or so away. Anangu were concerned that if a fire burned too close to the warrens it would endanger the Tjakura and remove protective covering from the sites (fallen branches are a foci of Tjakura warrens). Baiting was conducted at site A and C. Site D was previously unbaited but baiting was initiated after a warren was dug up by either a fox or dog.

Feral Carnivore and Plant Control (Knight 2004-2005) AW NRM, NHT

Of the four known Tjaku<u>r</u>a colonies two were baited and two left unbaited as controls. However, this method is under review. In August 2004 baiting was conducted at site A and C, taken baits were replaced at bait stations and baits placed around the perimeter of sites.

Protecting Threatened Species on the APY Lands (Cooke 2005-2006) AW NRM, NHT 2.

In addition to monitoring four existing Tjakura sites, two new areas with five active warrens were located in late November- early December and new colonies were also recorded in February 2006. Search effort was increased in nearby suitable habitat.

Tjaku<u>r</u>a monitoring and searches in the APY Lands 2007: Consultancy report funded by SA DEH. Field work assisted by APY Land Management and SA DEH (McAlpin 2007).

Six of seven known sites monitored. One new site, previously found by Watarru community elders, was recorded (I). All sites showed an increase in active warrens. Total population size is estimated at 273 individuals. Tjakura at Walalkara were inaccurately identified and are now believed to be *Egernia striata* also know as 'Tjaliri'. Recommendations include: annual monitoring of all colonies, assess the distribution of suitable habitat, search potential habitat to locate additional populations,

apply consistent data collection, develop and implement a fire management strategy for all Tjaku<u>r</u>a sites if needed.

Protecting Threatened Species on the APY Lands (Partridge 2006-2007) AW NRM, NHT 2.

Assisted with funding above monitoring work. Funded stopped after one year.

Threatened Species Project (Partridge 2006 – ongoing) Indigenous Land Corporation.

Assisted with funding above monitoring work, significant survey activities and this Recovery Plan. Funding committed until Sept 2010.

Watarru Indigenous Protected Area (Ongoing since 2000).

This project has supporting Tjaku<u>r</u>a management since their rediscovery at varying levels over the years.

